



THE ENGINEERING PROFESSION

CHAPTER I



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PROFESSION

- a paid occupation, especially one that involves prolonged training and a formal qualification
- E.g. engineer, barrister etc.

PROFESSION

- A formal education is one where you would go to a college or university for an actual degree.
- An informal education is simply learning a trade from someone else. It's possible to have a formal education and an informal education.
- The formal education is what most employers would prefer to see because it is easier to prove. Having a degree in a specific field will mean that you have certain knowledge that will translate into a better paying job and the company that's employing you getting a qualified person for the job.

PROFESSION

- An informal education is what many people end up having. You work under someone who has a degree or has been doing it for enough years to be knowledgeable about the subject.
- Many car mechanics and other "trade" skills usually have an informal education as to what they're doing.
- Informal education can also be referred to as life experience. After going through life for so many years, you'll naturally acquire some knowledge about different things that you may not even learn after going through a formal education.

PROFESSIONALISM TAKES MORE THAN KNOWLEDGE

- Professionalism is a way of thinking and living rather than an accumulation of learning
- Think: What does it take to be a doctor?
 - it's not just by going to medical school
- A profession isn't just what you do, it's who you are (link with ur inner self that how u r carrying and conducting your profession

THE FUNDAMENTAL CHARACTERISTICS OF A PROFESSION

- **Great responsibility**
- **Accountability**
- **Based on specialized, theoretical knowledge**
- **Institutional preparation**
- **Autonomy**
- **Clients rather than customers**
- **Direct working relationships**
- **Ethical constraints**
- **Merit-based**

CONTINUED..

- **Great responsibility**

Professionals deal in matters of vital importance to their clients and are therefore entrusted with grave responsibilities and obligations. Given these inherent obligations, professional work typically involves circumstances where carelessness, inadequate skill, or breach of ethics would be significantly damaging to the client and/or his fortunes.

- **Accountability**

Professionals hold themselves ultimately accountable for the quality of their work with the client. Professional accountability as being “answerable to oneself and others for one's own actions.” A professional should take right decision or action in light of best available knowledge and its consequences.

CONTINUED..

- **Based on specialized, theoretical knowledge**

Professionals provide specialized services based on theory, knowledge, and skills that are most often peculiar to their profession and generally beyond the understanding and/or capability of those outside of the profession. Sometimes, this specialization will extend to access to the tools and technologies used in the profession (e.g. medical equipment).

- **Institutional preparation**

Professions typically require a significant period of hands-on, practical experience in the protected company of senior members before aspirants are recognized as professionals.

CONTINUED..

- **Autonomy**

Professionals have control over and, correspondingly, ultimate responsibility for their own work. Professionals tend to define the terms, processes, and conditions of work to be performed for clients (either directly or as preconditions for their ongoing agency employment).

- **Clients rather than customers**

Members of a profession exercise discrimination in choosing clients rather than simply accepting any interested party as a customer (as merchants do).

- **Direct working relationships**

Professionals habitually work directly with their clients rather than through intermediaries or proxies.

CONTINUED..

- **Ethical constraints**

Due to the other characteristics on this list, there is a clear requirement for ethical constraints in the professions. Professionals are bound to a code of conduct or ethics specific to the distinct profession (and sometimes the individual). Professionals also aspire toward a general body of core values, which are centered upon an uncompromising and uncomplicated regard for the client's benefit and best interests.

- **Merit-based**

In a profession, members achieve employment and success based on merit. A professional is one who must attract clients and profits due to the merits of his work. In the absence of this characteristic, issues of responsibility, accountability, and ethical constraints become irrelevant, negating any otherwise-professional characteristics

10 THINGS THAT DEFINE A TRUE PROFESSIONAL

- Put customer satisfaction first
- Make expertise your specialty
- Do more than expected
- Do what you say and say what you can do
- Communicate effectively
- Praise your peers not yourself
- Share your knowledge
- Say thank you
- Keep a smile on your face and the right attitude in your heart

STRUCTURE OF ENGINEERING PROFESSION

- The engineering profession has a two tier structure.
- At the first level, there are the engineering institutions, that is, the chartered professional bodies, each of which covers a single or several closely related engineering disciplines. Examples are PIEAS, NUST, UET etc.
- The second level body in engineering is the engineering council, a chartered body which recognizes certain engineering institutions as its nominated bodies.
- Engineering council is satisfied that their standards of membership meet its requirements.

STRUCTURE OF ENGINEERING PROFESSION

- Engineering council represents the interests of the engineering profession as a whole.
- Pakistan Engineering Council is a professional body and constitutional federal institution for accreditation of engineering education and regulation of engineering profession in Pakistan.
- PEC is founded on January 10, 1976 and its parent organization is “Ministry of Science and Technology”.

DEVELOPMENT OF ENGINEERING PROFESSION

- The term engineer was first used in the sense of a military engineer concerned with military constructions.
- The term civil engineer was first used in 18th century to distinguish engineers who were concerned with civil construction.
- The first computer related organization “British Computer Society” was founded in 1957.
- Two recent professional engineering societies of ultimate reputation are ACM and IEEE.
- ACM stands for Association for Computing Machinery.
- IEEE stands for Institution of Electrical and Electronic Engineers.

DEVELOPMENT OF ENGINEERING PROFESSION

- Both ACM and IEEE-Computer Society publish a range of journals covering theory and practice in all aspects of IT.
- These academic and professional publications are the most prestigious and the most widely read in the field.
- IEEE Computer Society and ACM collaborate extensively on matters connected with the software engineering profession.
- Together they have produced the software engineering code of ethics, that is the main code of conduct for software engineers.

ENGINEERING PROFESSION IN PAKISTAN

- The position of software engineering
 - SW Engineering is an engineering discipline that is concerned with all aspects of software production.
 - Pakistan is included amongst one of those countries which have highest demand for software engineers at the moment because of the advancement of IT and its applications.
 - In the passage of time ranging from the last decade Pakistan has created a wide market and growth in the software engineering department including both private and government sectors.

ENGINEERING PROFESSION IN PAKISTAN

- The position of software engineering
 - It has become one of the main branches of engineering like civil and mechanical.
 - With software pervading virtually all aspects of our work in our society, a software Engineering graduate has the option to work in many different sectors such as telecommunications, finance, health care, manufacturing, retailing, security, transport.
 - Other engineering areas like aeronautical, automotive, building, electrical, etc. also have increasing needs for software engineering.
 - The entertainment industry with video games and movie animation also has a large demand for Software Engineers.

ETHICS, MORALS AND LAWS

Ethics is the moral principles that govern a person's behavior or the conducting of an activity.

Morals are concerned with the principles of right and wrong behavior and the goodness or badness of human character.

Law is the system of rules that a particular country or community recognizes as regulating the actions of its members and may enforce by the imposition of penalties.

DIFFERENCE

Ethics and morals relate to “right” and “wrong” conduct. While they are sometimes used interchangeably, they are **different**:

Ethics refer to rules provided by an external source, e.g., codes of conduct in workplaces or principles in religions.

Morals refer to an individual's own principles regarding right and wrong.

WHAT IS A BELIEF?

- A belief is an idea that a person holds as being true.
- A person can base a belief upon certainties (e.g. mathematical principles), probabilities or matters of faith. A belief can come from different sources, including:
 - a person's own experiences or experiments
 - the acceptance of cultural and societal norms (e.g. religion)
 - what other people say (e.g. education or mentoring).
- A potential belief sits with the person until they accept it as truth, and adopt it as part of their individual belief system. Each person evaluates and seeks sound reasons or evidence for these potential beliefs in their own way. Once a person accepts a belief as a truth they are willing to defend, it can be said to form part of their belief system.

WHAT IS A PERSONAL VALUE?

- Values are stable long-lasting beliefs about what is important to a person.
- They become standards by which people order their lives and make their choices.
- A belief will develop into a value when the person's commitment to it grows and they see it as being important.
- It is possible to categorize beliefs into different types of values – examples include values that relate to happiness, wealth, career success or family.
- A person must be able to articulate their values in order to make clear, rational, responsible and consistent decisions.

WHAT IS AN ATTITUDE?

- Attitudes are the mental dispositions people have towards others and the current circumstances before making decisions that result in behavior
- People primarily form their attitudes from underlying values and beliefs. However, factors which may not have been internalized as beliefs and values can still influence a person's attitudes at the point of decision-making. Typical influences include the desire to please, political correctness, convenience, peer pressure, and psychological stressors
- The potential for these influences to sway attitudes will be greater if the person has not clearly thought through their beliefs and values.
- A lack of self-awareness or critical insight, or the presence of ambivalence or uncertainty about values, can lead to a less rational attitude to choices, and ultimately to undesirable behavior.

PERSONAL ETHICS

- As with beliefs and values, personal ethics can differ widely from person to person. As mentioned already, beliefs and values often motivate a person by defining what they see as being important. In turn, they influence a person's attitudes, and how they behave.
- In other words, personal ethics are standards by which a person judges behavior as being 'right' or 'wrong'

THE DIFFERENCE BETWEEN PERSONAL AND PROFESSIONAL ETHICS

- Personal ethics refers to the ethics that a person identifies with in respect to people and situations that they deal with in everyday life.
- Professional ethics refers to the ethics that a person must adhere to in respect of their interactions and business dealings in their professional life.
- In some cases, personal and professional ethics may clash and cause a moral conflict.
- For example:
 - A police officer may personally believe that a law that he is required to enforce is wrong. However, under the Code of Conduct for the Police, he is required to obey all lawful and reasonable instructions to enforce that law unless there is good and sufficient cause to do otherwise.
 - A doctor may not personally believe that the course of medical treatment chosen by a patient is the right one. However, under the Code of Ethics for the Medical Association, she must respect the rights, autonomy and freedom of choice of the patient.

ASSIGNMENT#1

- You are the owner of a software engineering company. Your employees (engineers) want you to pay for them to attend training.
How would you respond in a way that is legal, moral, and ethical?
- You are a software engineer working at a large publicly-traded corporation, where a colleague invents a new kind of compiler. Your managers see it as a huge potential cash cow.
How would you respond in a way that is legal, moral, and ethical?